



RECEIVED

OCT 09 2002

TC 1700

U.S. Application No. 09/372,636
Attorney's Docket No. 364/56

REMARKS

Claims 1-7, 9-12, 14 and 15 are pending in the application and stand rejected. Specifically, claims 1, 6-7 and 9-12 stand rejected as allegedly unpatentable over U.S. Patent No. 5,927,378 to Grove et al. ("Grove"); claims 1 and 9 stand rejected as allegedly unpatentable over U.S. Patent No. 5,797,444 to Villanueva et al. ("Villanueva"); claims 1-5 and 9 stand rejected as allegedly unpatentable over the English language translation of WO 97/43063 to Stagge et al. ("Stagge"); claims 1 and 9 stand rejected as allegedly unpatentable over U.S. Patent No. 4,658,884 to Euler et al. ("Euler"); claims 1 and 9 stand rejected as allegedly unpatentable over U.S. Patent No. 3,595,302 to Mallener; claims 1 and 9 stand rejected as allegedly unpatentable over GB 2,177,331 to Makelainen; claims 1 and 9 stand rejected as allegedly unpatentable over Figures 1-8 and the English language abstract of Japanese Patent No. JP 59-133940 A and claims 6, 7, 12, 14 and 15 stand rejected as allegedly unpatentable over various combinations of the prior art of record.

Applicants respectfully submit that independent claim 1 is not obvious over Grove. The reference alleges a mold liner for continuous casting of metals that has a selective cooling structure for selectively cooling the mold liner assembly such that cooling is directed in varying intensities to different portions of the inner surface of the mold liner assembly. See col. 2, lines 10-14. (Emphasis added.) Grove does not teach any quantitative limitations on the difference in the heat flow rate between thermally and mechanically stressed portions and other portions of the their mold liner. In contrast, claim 1 recites quantitative limitations on the difference in rate of heat flow between different portions of the mold. Applicants respectfully submit that Grove does not render the invention of claim 1 unpatentable because, among others, the reference fails to disclose or suggest that surface related heat flow in the more stressed areas of the bath surface is within the specific range of 5-40% greater than in other areas of the bath surface. For at least these reasons Applicants respectfully request reconsideration and withdrawal of the obviousness rejection of claim 1 over Grove.

Independent claim 1 is also not obvious over Villanueva. The reference alleges a funnel-type ingot mold having a cooling optimized area (col. 2, lines 4-5) made-up of, e.g., triangular shaped depressions. Villanueva also alleges that the geometry of the depressions is uniform over the cooling optimized area. See, e.g., Villanueva, col. 2, lines 2-29. The reference does not teach that the dimensions (e.g., depth) or geometry of their depressions should be varied to achieve specific quantitative differences in heat flow rate between specific cooling zones or between different portions of their cooling optimized area, as is required by Applicants' claims. Therefore, Applicants respectfully request reconsideration and withdrawal of the obviousness rejection of claim 1 over Villanueva.

Turning to the English language translation of Stagge (WO 97/43063), Applicants respectfully submit that this reference also fails to render claim 1 unpatentable. Stagge is directed to a liquid-cooled mold for strand casting thin iron slabs wherein the copper plates are fastened to the supporting plate via metal bolts. Stagge alleges that the stainless steel bolts connecting the copper plate to the supporting plate are disadvantageous as they weld poorly to the copper plate. The reference adds that the problems is caused by the different grain type/size in the bolt material and the plate material. To overcome this problem, Stagge alleges selectively molding metal bolts of a mold body from a CuNiFe alloy to increase stability of the welded joints with the copper plate. See, e.g., Stagge at page 3, lines 3-6. Stagge does not disclose or suggest raising the heat flow rate in the mechanically and thermally stressed areas in relation with heat flow rate in other areas of the die surface. While Stagge alleges providing coolant channels along the broadside walls, the reference does not disclose the feature of increasing heat transfer rate in the mechanically and thermally stressed parts of the die as compared to the other areas of the die. Nor does the reference disclose a critical range as claimed by Applicants. Indeed, Stagge does not even recognize the problem contemplated by Applicants. For at least theses reasons, Applicants respectfully submit that Stagge fails to render claim 1 unpatentable. Reconsideration and withdrawal of the obviousness rejection over Stagge is respectfully requested.

Turning to Euler, Applicants respectfully submit that independent claim 1 is not rendered unpatentable by this reference. Euler is directed to a mold for continuous casting of rounds or billets. In particular, Euler alleges providing a tubular envelop around the mold "with cooling grooves extending predominantly in longitudinal direction and being arranged on the side facing away from the liquid content of the mold." Col. 1, lines 64-67. In the embodiment of FIG. 3 and the portions cited by the Examiner (col. 4, lines 3-21), the reference alleges mold 2 having v-shaped grooves 16 formed therein. The base of grooves 16 face the surface being cooled. Euler fails to disclose or suggest a casting die body having "a cooling zone in thermally and mechanically stressed areas of the die body, the mold surface in said cooling zone having a rate of heat flow 5-40% greater than that in the remainder of the surface of the casting die." (Emphasis added.) There is no suggestion in the reference concerning greater heat flow rate in the thermally and mechanically stressed areas of the mold. Accordingly, Applicants respectfully submit that Euler does not render invention recited in claim 1 unpatentable and respectfully request the Examiner's reconsideration and withdrawal of the obviousness rejection of claim 1 over Euler.

Applicants further submit that claim 1 is patentable over U.S. Patent No. 3,595,302 to Mallener. At col. 1, lines 27-31, the reference discloses: "it is believed that for the most effective casting the greatest amount of heat should be abstracted from the upper portions of the mold cavity" Emphasis added. Referring to FIG. 4, the reference discloses: "grooves 16b and 16b' are at the upper portions of the interfaces 15b between the mold plates 11b and backing plates 12b and have different cross-sectional dimensions and different depth, to provide thinner mold plate walls" Thus, Mallener alleges removing heat from the upper portions of the mold cavity. The reference does not disclose or suggest having "a cooling zone in thermally and mechanically stressed areas of the die body." Nor does the reference disclose "cooling zone having a rate of heat flow 5-40% greater than that in the remainder of the surface of the casting die." Hence, this reference also fails to render the invention of claim 1 unpatentable. Applicants respectfully request

reconsideration and withdrawal of the obviousness rejection of claim 1 over Mallener.

U.K. Patent Application No. 2 177 331 A concerns a continuous casting mold. At page 1, lines 22-26, the reference discloses that "the most intensive thermal strain is directed on the mould wall in the region where the boundary of molten metal fluctuates during the casting operation, as well as in the immediate vicinity of the said region." The reference alleges improving heat transfer capacity of the mold wall as it discloses at page 1, lines 88-93: "heat transfer capacity of the mould wall can be regionally improved by providing the outer circumference of the mould with grooves, the longitudinal direction whereof is roughly parallel to the central direction of the mould." The reference fails to render the embodiment recited in claim 1 unpatentable for at least the reason that it fails to disclose or suggest having a cooling zone in the thermally and mechanically stressed areas. Not only does the reference fail to disclose providing a cooling zone in the thermally and mechanically stressed areas of the mold as disclosed and claimed by Applicants, but the reference also fails to suggest a heat flow rate of 5-40% greater in the cooling zone than the remainder of the surface of the casting die. For at least these reasons, Applicants respectfully submit that the reference does not render the embodiment recited in claim 1 unpatentable. Applicants respectfully request reconsideration and withdrawal of the obviousness rejection of claim 1 over U.K. Patent Application No. 2 177 331 A.

Finally, Applicants respectfully submit that JP 59-133940 A does not render the claimed invention unpatentable. Referring to Fig. 2, the English language translation of the abstract alleges "the cooling power of a short side copper plate 2 using cooling water is changed in accordance with the change in the thermal load in the vertical direction in a casting billet." The reference adds that the passage speed of cooling water as well as the depth and length of the slit 3 (Fig. 2), among others, can be adjusted to maintain a uniform temperature. Applicants respectfully submit that the English Language translation as well as Figures 1-8 fail to render the embodiment recited in claim 1 obvious. In particular, the English language

translation seems directed to the "short side copper plate 2". It is not clear whether the so-called "short side copper plate" is in fact a thermally and mechanically stressed area. The English language translation also fails to disclose or suggest providing heat flow rate of 5-40% greater in the thermally and mechanically stressed areas than the remainder of the surface of the casting die. For at least these reasons, Applicants respectfully submit that the reference does not render claim 1 obvious. Reconsideration and withdrawal of the obviousness rejection over JP 59-133940 A is respectfully requested.

For at least these reasons, Applicants respectfully submit that claim 1 is patentable over the art of record. Since each of claims 2-7, 9-12 and 14-15, depend either directly or indirectly from claim 1, it is respectfully submitted that each of claims 2-7, 9-12 and 14-15 are also patentable over the art of record. Further, the rejection of dependent claims over a combination of cited prior art will not be addressed here as each of the dependent claims depends from an independent claim which is patentable over the art of record.

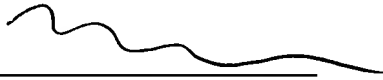
CONCLUSION

In view of the foregoing, reconsideration and allowance of this application are now believed to be in order, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

Applicants hereby request that the Office charge any appropriate extension of time fee which may be required to maintain the pendency of this case, and any other required fee, except for the Issue Fee, to Deposit Account No. 11-0600.

Respectfully submitted,

Date: October 2, 2002



KENYON & KENYON

By: Richard M. Rosati
Reg. No. 31,792

One Broadway
New York, NY 10004
Tel. No.: (212) 425-7200
Fax No.: (212) 425-5288

CUSTOMER NO. 26646
PATENT TRADEMARK OFFICE